



## Automation in Today's Pharmacy

The James



**THE OHIO STATE UNIVERSITY**  
WEXNER MEDICAL CENTER

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NPPA Conference  
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The Ohio State University Comprehensive Cancer Center – Arthur G. James Cancer Hospital and Richard J. Solove Research Institute

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We are central Ohio's only academic medical center

<b>7</b> hospitals	<b>1,506</b> beds	<b>9</b> multispecialty centers	<b>NCI</b> designated comprehensive cancer center	<b>100+</b> facilities
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## Department of Pharmacy Overview

- ~ 500 FTEs
  - 600 employees
  - 30 Pharmacy Residents
- 12 Pharmacy Licenses
- 23 Pharmacy Locations
  - 2 Specialty/Retail Locations
- 12 million doses dispensed annually
- 340B Covered Entity
- Approaching spend of \$450 million annually
- Robust services in patient care, operations, medication safety, informatics, and finance



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## Technology: Medication Distribution

- **UH/Ross**
  - Hybrid distribution, mostly **decentralized**
  - ~14,000 doses per day
  - ~80% of medications from Pyxis
  - ~20% of medications from Central/cart fill/ IVs
- **James (Inpatient)**
  - Hybrid distribution, mostly **centralized**
  - About 8,000 dispenses per day
  - About 60% of meds from Pyxis
  - About 37% of meds from central automation
  - About 3% of meds picked manually
  - (About 10% of all dispenses are IVs)

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## Pharmacy Automation:

The development of today's pharmacy automation has allowed pharmacies to become more streamlined and efficient from procurement to dispensing.

In this presentation our goal is to introduce and explain the function and impact of this automation on the pharmacy department as a whole.



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## Pharmacy Automation

Please note we are going to discuss various aspects of pharmacy automation and we will refer to the specific products we use; however, there are other products available that may have similar features. We are not specifically endorsing any product or showing any bias, just discussing the products we use as a way to illustrate automation.

Some of the automations to be discussed include Swisslog, ATP, Apoteca, Epic Willow Inventory, and Pyxis.

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## Pharmacy Automation & Technology:

Integration from Receiving to Administration



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## Virtual Inventory Platform (VIP)

- Virtual Inventory platforms support multi-facility medication inventory management.
- It includes features that support automated balance updates based on dispense and transfers, recording of returns and waste, easy intra-facility stock transfers, automated purchase order generation and replenishment.
- Some also interface to medication wholesalers and pharmacy automation.

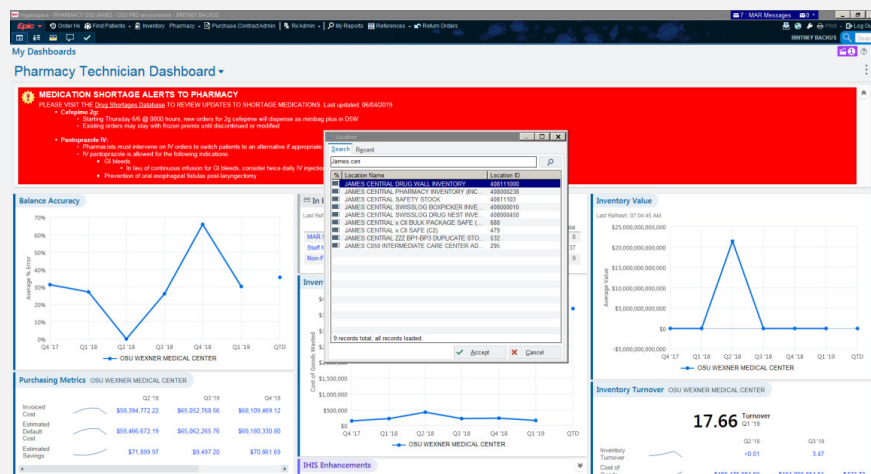
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## Virtual Inventory Platform

- Full transparency of inventory items across the entire pharmacy system
- Interfaces with wholesale ordering platform and pharmacy automation
- Allows for default NDC selection
- Internal inventory transfers and billing
- Auto order function
- Build, place, receive order capabilities
- Flexibility when changing products

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## Virtual Inventory Platform



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# Virtual Inventory Platform

- Select Inventory to work in
- Detailed line item view
- Create orders
- Transfer product from one inventory location to another for billing
- Cycle count
- View open orders
- View requests to fill for other sites
- Update inventory counts
- Adjust par levels
- Show min/max

Inventory: JAMES CENTRAL SWISSLOG BOXCIPHER INVENTORY (INCLUDES BP-1 and BP-2 ONLY)									
<a href="#">Create Request</a>   <a href="#">Direct Transfer</a>   <a href="#">Update Packages</a>   <a href="#">Request Queue</a>   <a href="#">Lot and Expiration Manager</a>   <a href="#">Inventory Item Report</a>   <a href="#">Print Worksheet</a>   <a href="#">Adjust Par Levels</a>   <a href="#">Cycle Count</a>									
<div> <div>Inventory Items</div> <div>Outgoing Requests (13)</div> <div>Requests to Fulfill (4)</div> </div>									
<div> <input type="text" value="Search by medication, NDC, or inventory item"/> <input type="button" value="Filter by: Items below critical Items below par"/> </div>									
<input checked="" type="checkbox"/>	Inventory Item	In Stock	On Order	Par	Critical	Optimum	Max Location		
<input checked="" type="checkbox"/>	ABUFY MAINTENA 40 MG IM SR	1 Each					Boxcipher 1 (BP-1)		
<input type="checkbox"/>	ACETAMINOPHEN 160 MG/5ML PO SOLN, 10.15 mL Cup	96 Cup		20 Cup		100 Cup	Boxcipher 1 (BP-1)		
<input type="checkbox"/>	ACETAMINOPHEN 160 MG/5ML PO SOLN, 20.3 mL Cup	202 Cup		200 Cup		300 Cup	Boxcipher 1 (BP-1)		
<input type="checkbox"/>	ACETAMINOPHEN 160 MG/5ML PO SOLN, 5 mL Cup	97 Cup		50 Cup		100 Cup	Boxcipher 1 (BP-1)		
<input type="checkbox"/>	ACETAMINOPHEN 650 MG RE SUPP	23 Each		12 Each		24 Each	Boxcipher 1 (BP-1)		
<input type="checkbox"/>	ACETAZOLAMIDE ER 500 MG PO CAP SR	23 Each		15 Each		30 Each	Boxcipher 1 (BP-1)		
<input type="checkbox"/>	ACETAZOLAMIDE SODIUM 500 MG SOLN, 1 Each, Vial	21 Each		15 Each		25 Each	Boxcipher 1 (BP-1)		
<input type="checkbox"/>	ACETIC ACID 5% SOLN, 500 mL Bottle	5 Bottle		3 Bottle		5 Bottle	Boxcipher 1 (BP-1)		
<input type="checkbox"/>	ACETYLCOLINE CHLORIDE 20 MG IO SOLR	0 Vial	1 Val	1 Vial	0 Vial	1 Vial	Boxcipher 1 (BP-1)		
<input type="checkbox"/>	ACETYLCYSTINE 20% IN SOLN, 30 mL Vial	31 Vial		5 Vial	0 Vial	25 Vial	Boxcipher 1 (BP-1)		
<input type="checkbox"/>	ACETYLCYSTINE 20% IN SOLN, 4 mL Vial	1 Vial		5 Vial	0 Vial	25 Vial	Boxcipher 1 (BP-1)		
<input type="checkbox"/>	ACTIDOSORB/OT 25 GM/120ML PO LIQD, 120 mL	10 Tube		0 Tube		0 Tube	Boxcipher 1 (BP-1)		
<input type="checkbox"/>	ADENOSINE 6 MG/2ML IV SOLN 2 mL Vial	29 Vial		20 Vial		30 Vial	Boxcipher 1 (BP-1)		
<input type="checkbox"/>	ALBUTEROL SULFATE (2.5 MG/3ML) 0.083% IN NEBU, 3 mL, Plus Cont	44 Plus Cont		15 Plus Cont		30 Plus Cont	Boxcipher 1 (BP-1)		
<input type="checkbox"/>	ALBUTEROL SULFATE (5 MG/3ML) 0.5% IN NEBU, 1 Each, Plus Cont	185 Plus Cont		5 Plus Cont		30 Plus Cont	Boxcipher 1 (BP-1)		
<input type="checkbox"/>	ALBUTEROL SULFATE 2 MG PO TABS	10 Each		10 Each		100 Each	Boxcipher 1 (BP-1)		
<input type="checkbox"/>	ALBUTEROL SULFATE HFA 108 (90 BASE) MCG/ACT IN AERS, 8 g, Inh.	6 Inhaler	4 Inhaler	5 Inhaler		8 Inhaler	Boxcipher 1 (BP-1)		

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# Virtual Inventory Platform

[illegible]

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## Virtual Inventory Platform

Date	User	Reason	Linked ID	Change (Cost)	Balance (Cost)
06/10/2019	User: Interface	ADS Unload	--	-11	219
06/10/2019	User: Interface	ADS Unload	--	-4	223
06/10/2019	User: Interface	ADS Unload	--	-4	235
06/10/2019	User: Interface	ADS Unload	--	-18	219
06/10/2019	User: Interface	ADS Unload	--	-4	214
06/10/2019	User: Interface	ADS Unload	--	-1	213
06/10/2019	User: Interface	ADS Unload	--	-11	202

Transaction history provides a look at product movement

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## Virtual Inventory Platform

**General Details**

Location: JAMES CENTRAL SWISSLOG BOXPICKER INVENTORY (INCLUDES BP-1 and BP-2 ONLY)

Sub location: Boxpicker 1 (BP-1)

Inventory item: ACETAMINOPHEN 160 MG/5ML PO SOLN, 20.3 mL, Cup

Inventory class: Facility Administered

Active from: [Date] Active to: [Date]

**Inventory**

☒ Display balances by package

Maximum: [202] Cup

Optimum: [300] Cup

Par: [200] Cup

Critical: [ ] Cup

Minimum number of packages to reorder: [ ]

Current balance: 202 Cup

Calculated optimum: 172 Cup

Calculated par: 131 Cup

Calculated date: 06/10/2019 6:03:37 AM

Last updated action: Set manually

Last updated date: 10/04/2017 12:29:46 PM

**Cost**

- Choose sub-location
- Set par levels
- Display by package/mL
- Calculated pars
- Cost

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## Virtual Inventory Platform

Item Balance: ACETAMINOPHEN 160 MG/5ML PO SOLN, 20.3 mL, Cup, JAMES CENTRAL SWISSLOG BOXPICKER INVENTORY (INCLUDES BP-1 and BP-2 ONLY)

Summary General NDC Settings	NDC Details											
	<input checked="" type="checkbox"/> Keep on medication list (F7) <input checked="" type="checkbox"/> Default reorder (F8) <input checked="" type="checkbox"/> Dispense package (F9) <input checked="" type="checkbox"/> Do not reorder											
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	NDC Code	Count	Package Size	Description	Manufacturer	Medication	Use Type	Modifiers
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0121-0657-21	100	20.3 mL	Cup	PHARMACEUTICAL ASSOCIATES	ACETAMINOPHEN 160 MG/5ML PO SOLN	Unit-Dose	RED, CHERRY, ALCOHOL FREE
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0121-1971-00	100	20.3 mL	Cup	PHARMACEUTICAL ASSOCIATES	ACETAMINOPHEN 650 MG/20.3ML PO SOLN	Unit-Dose	RED, CHERRY, ALCOHOL FREE
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0121-1971-21	1	20.3 mL	Cup	PHARMACEUTICAL ASSOCIATES	ACETAMINOPHEN 650 MG/20.3ML PO SOLN	Unit-Dose	RED, CHERRY, ALCOHOL FREE
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0904-6820-76	100	20.3 mL	Cup	MAJOR PHARMACEUTICALS	ACETAMINOPHEN 650 MG/20.3ML PO SOLN	Unit-Dose	INSTITUTIONAL/HOSP. PACK, CH
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	66689-056-01	1	20.3 mL	Cup	VISTAPHARM INC.	ACETAMINOPHEN 650 MG/20.3ML PO SOLN	Unit-Dose	CHERRY, ALCOHOL FREE
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	66689-056-99	100	20.3 mL	Cup	VISTAPHARM INC.	ACETAMINOPHEN 650 MG/20.3ML PO SOLN	Unit-Dose	CHERRY, ALCOHOL FREE

- Ability to set default NDC
- Shows line item description (manufacturer, unit dose vs. bulk, specific item descriptors such as flavor, color, etc.)

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## Virtual Inventory Platform

- Designate whether to dispense by package or mL
- Update current on hands

**Medication List Settings**

☐ Add medication to linked preference list

☒ Always dispense by package

Default inventory item for dispensing:  (Inventory item name)

Override default inventory item for dispensing with this item?

[Update Balances](#)

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## Virtual Inventory Platform

- Generate an order
  - Items below par
  - Items below Critical provides the option to set pars for only must have critical lows, rather than items that have just fallen below par

Inventory: JAMES CENTRAL SWISSLOG BOXPICKER INVENTORY (INCLUDES BP-1 and BP-2 ONLY)

Search by medication, NDC, or inventory item

Filter by: **Items below critical** **Items below par**

Inventory Item	In Stock	On Order	Par	Critical	Optimum	Max Location
<input checked="" type="checkbox"/> ATROPINE SULFATE 1% OP SOLN, 2 mL	3 Bottle	6 Bottle	10 Bottle	Boopicker 1 (BP-1)		
<input type="checkbox"/> AZITHROMYCIN 200 MG/5ML PO SUSP, 30 mL, Bottle	2 Bottle	3 Bottle	0 Bottle	Boopicker 1 (BP-1)		
<input type="checkbox"/> CYANOCOBALAMIN 1000 MCG/ML U SOLN, 1 mL, Vial	3 Vial	10 Vial	0 Vial	Boopicker 1 (BP-1)		
<input type="checkbox"/> DIMETHYL SULFOXIDE SOLN, 100 mL, Bottle	0 25 Bottle	1 Bottle	0 Bottle	Boopicker 1 (BP-1)		
<input type="checkbox"/> ENOXAPARIN SODIUM 30 MG/0.3ML SC SOLN, 0.3 mL, Syringe	35 Syringe	40 Syringe	0 Syringe	Boopicker 1 (BP-1)		
<input type="checkbox"/> FLUCONAZOLE 40 MG/4ML U SOLN, 4 mL, Vial	62 Vial	75 Vial	0 Vial	Boopicker 1 (BP-1)		
<input type="checkbox"/> GLYCERIN (LAXATIVE) 2 G RE SUPP	4 Each	5 Each	10 Each	Boopicker 1 (BP-1)		
<input type="checkbox"/> HALOPERIDOL LACTATE 5 MG/ML U SOLN, 1 mL, Vial	71 Vial	75 Vial	0 Vial	Boopicker 1 (BP-1)		
<input type="checkbox"/> HYDROXYUREA 500 MG PO CAPS	177 Each	200 Each	300 Each	Boopicker 1 (BP-1)		
<input checked="" type="checkbox"/> IMMUNE GLOBULIN (HUMAN) 20 GM/200ML IV SOLN (PRIVIGEN), 200	9 Vial	10 Vial	10 Vial	Boopicker 1 (BP-1)		
<input type="checkbox"/> ISOSULFAN BLUE 1% SC SOLN, 5 mL, Vial	7 Vial	9 Vial	18 Vial	Boopicker 1 (BP-1)		
<input type="checkbox"/> KETOROLAC TROMETHAMINE 30 MG/ML U SOLN	61 Vial	125 Vial	0 Vial	Boopicker 1 (BP-1)		
<input type="checkbox"/> METHYLPREDNISOLONE SODIUM SUCC 40 MG U SOLN, 1 Each, Vial	43 Each	50 Each	75 Each	Boopicker 1 (BP-1)		
<input type="checkbox"/> PALONOSETRON HCL 0.25 MG/ML IV SOLN, 5 mL, Vial	13 Vial	50 Vial	0 Vial	Boopicker 1 (BP-1)		
<input type="checkbox"/> SILVER SULFADIAZINE 1% EX CREA, 20 g, Tube	0 Tube	1 Tube	0 Tube	Boopicker 1 (BP-1)		
<input checked="" type="checkbox"/> THROMBIN 5000 UNITS EX KIT	-1 Box	10 Box	15 Box	Boopicker 1 (BP-1)		
<input type="checkbox"/> TRIAMCINOLONE ACETONIDE 0.1% EX CREA, 15 g, Tube	5 Tube	6 Tube	0 Tube	Boopicker 1 (BP-1)		
<input type="checkbox"/> VALPROATE SODIUM 250 MG/5ML PO SYRP, 5 mL	54 Cup	60 Cup	0 Cup	Boopicker 1 (BP-1)		
<input type="checkbox"/> ABXOMAB 2 MG/ML IV SOLN, 5 mL, Vial	0 Vial	3 Vial	0 Vial	Boopicker 2 (BP-2)		
<input type="checkbox"/> ASPIRIN 300 MG RE SUPP	-1 Each	12 Each	24 Each	Boopicker 2 (BP-2)		
<input type="checkbox"/> BACITRACIN 50000 UNITS IM SOLN	20 Each	60 Each	90 Each	Boopicker 2 (BP-2)		
<input type="checkbox"/> FILGRASTIN 450 MCG/1.5ML U SOLN	36 Vial	40 Vial	0 Vial	Boopicker 2 (BP-2)		

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## Virtual Inventory Platform

Inventory Request (Draft)

Order: Normal

Item	NDC	Pkg Size	Qty	Unit Cost	Contract
1. ATROPINE SULFATE 1% OP SOLN, 2 mL	11675-275-02	2 mL	7	1.00	100 Contract (max) - Interface - UPSHORE INC, James GPO, OP 3000
2. AZITHROMYCIN 200 MG/5ML PO SUSP, 30 mL, Bottle	1883-200-01	30 mL	2	1.00	100 Contract (max) - Interface - UPSHORE INC, James GPO, OP 3000
3. CYANOCOBALAMIN 1000 MCG/ML U SOLN, 1 mL, Vial	101-1000-01	1 mL	1	1.00	100 Contract (max) - Interface - UPSHORE INC, James GPO, OP 3000
4. DIMETHYL SULFOXIDE SOLN, 100 mL, Bottle	188-100-01	100 mL	2	1.00	100 Contract (max) - Interface - UPSHORE INC, James GPO, OP 3000
5. ENOXAPARIN SODIUM 30 MG/0.3ML SC SOLN, 0.3 mL, Syringe	101-1000-01	0.3 mL	1	1.00	100 Contract (max) - Interface - UPSHORE INC, James GPO, OP 3000
6. FLUCONAZOLE 40 MG/4ML U SOLN, 4 mL, Vial	188-100-01	4 mL	2	1.00	100 Contract (max) - Interface - UPSHORE INC, James GPO, OP 3000
7. IMMUNE GLOBULIN (HUMAN) 20 GM/200ML IV SOLN (PRIVIGEN), 200	188-100-01	200 mL	1	1.00	100 Contract (max) - Interface - UPSHORE INC, James GPO, OP 3000
8. KETOROLAC TROMETHAMINE 30 MG/ML U SOLN	188-100-01	30 mL	1	1.00	100 Contract (max) - Interface - UPSHORE INC, James GPO, OP 3000

Comments

Order Request Submit Request Save as Draft Cancel

- Create order for multiple “contracts”
- Contracts designate where an order is being sent
- Order sent to wholesale online order platform through EDI

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## Virtual Inventory Platform

- Visibility of order status, supplier and contract info, request number to receive against

**Inventory: JAMES CENTRAL SWISSLOG BOXPICKER INVENTORY (INCLUDES BP-1 and BP-2 ONLY)**

[Create Request](#)
[Direct Transfer](#)
[Update Balances](#)
[Request Queue](#)
[Lot and Expiration Manager](#)
[Inventory Item Report](#)
[Print Worksheet](#)
[Adjust Par Levels](#)
[Cycle Count](#)
[Open a Request](#)
[Admin](#)

Inventory Items | **Outgoing Requests (14)** | Requests to Fulfill (4)

Filter by status:

Request Number	Status	Supplier	Contract	Date Requested	Expected Date	Comments
2883262	Submitted	CuraScript Specialty Distribution	Curascrip - Primary	6/11/2019		
2883261	Submitted	Cardinal Health - Manual Order	Cardinal MANUAL ORDER - Primary - ...	6/11/2019	6/12/2019	
BP1-2883260	Submitted - Initiated request to supplier	Cardinal Health	Cardinal (main) - Interface - UH/UHE...	6/11/2019		
BP1-2878611	Submitted - Acknowledgement received	Cardinal Health	Cardinal GPO - Interface - UH/UHE/Ja...	6/10/2019	6/11/2019	
BP1-2878610	Processing	Cardinal Health	Cardinal (main) - Interface - UH/UHE...	6/10/2019		
BP1-2871883	Processing	Cardinal Health	Cardinal (main) - Interface - UH/UHE...	6/6/2019		
2838244	Shipped	UH Main Pharmacy	UH Main - Internal	5/31/2019		

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## Drug Order Receiving

- Wholesaler totes are labeled with the request number generated by our Virtual inventory platform
- Order is opened and items are scanned to receive in VIP
- If item is changed/substituted in wholesaler ordering platform the original item NDC ordered will zero out and the replacement will add a line item to the order

**Inventory Request: BP1-2871883 (Processing)**

[General](#)
[Shipment 1 \(Completed\)](#)
[Shipment 2 \(Completed\)](#)
[Discrepancies](#)
[Acknowledgement Summary](#)

Filter by:

☐ Only show discrepancies [Clear Filter](#)

Item	NDC	Expected Pkg	Ord	Rec	Inv	Fill Status
1 ACETAMINOPHEN 160 MG/5ML PO SOLN, 20.3 mL, Cup	0121-1971-00	2 x 100 x 20.3	0	0	0	Closed
2 ALBUTEROL SULFATE HFA 108 (90 BASE) MCG/ACT IN AERS, 8 g, Inhaler	0173-8682-24	5 x 8 g	5	5	5	Closed
3 ALUM & MAG HYDROXIDE-SMETH PO SUSP, 30 mL, Cup	0121-1761-30	1 x 100 x 30 mL	1	1	1	Closed
4 AZATHIOPRINE 50 MG PO TABS	51079-920-06	1 x 50 Each	0	0	0	Closed
5 BUDESONIDE-FORMOTEROL FUMARATE 160-4.5 MCG/ACT IN AERO, 6 g, Inhaler	0186-0370-28	9 x 6 g	9	9	9	Closed
6 CAMPHOR-MENTHOL 0.5-0.5 % EX LOTN, 222 mL, Bottle	54162-550-07	4 x 222 mL	0	0	0	Closed
7 CAMPHOR-MENTHOL 0.5-0.5 % EX LOTN, 222 mL, Bottle	0145-0628-05	0 x 222 mL	4	4	4	Closed
8 CYCLOPENTOLATE HCL 1 % OP SOLN, 15 mL, Bottle	11476-100-12	2 x 15 mL	1	1	1	Closed
9 DEKAMETHASONE SODIUM PHOSPHATE 4 MG/ML U SOLN, 1 mL, Vial	67457-423-12	9 x 25 x 1 mL	9	9	9	Closed
10 DIMETHYL SULFOXIDE SOLN, 100 mL, Bottle	38779-2430-5	2 x 100 mL	2	2	2	Closed

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## Swisslog Automation

### Box Picker



- Eliminate human touch
- More efficient pharmacy work flow
- Minimize medication errors
- Better inventory management
- Cost savings
- Elimination of manual packaging processes
- Visualization into drug movement

### Drug Nest



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## Automated Storage and Dispensing System

- All items must be parametered into the inventory management software
- A pharmacist check must be performed before the drug can be accepted into the automation
- Parameter Order Entry:
  - All drug information
  - Par levels
  - Physical storage information
    - Box vs. Special bay
    - Refrigerated
    - Expiration info

The screenshot shows the 'Refill Manager' software interface. The 'Drug management' tab is active, displaying fields for drug code, brand name, generic name, pack code, form, strength, and volume/dry. Below these fields is a table of drug packages with columns for drug package code, barcode, package quantity, type, manufacturer, status, and free test pack. The status column is highlighted in red.

Drug package code	Barcode	Package quantity	Type	Manufacturer	Status	Multi-do	Free test pack
36332364849		10	Package	6323 - Fresenius Kabi	Checked	0	632336484
30781300088		10	Package	00781 - Lek Pharmaceuticals	Checked	0	00781300088
30781300029		10	Package	00781 - Teva Pharmaceuticals	Checked	0	00781300029
011036332364846		1	Package	6323 - Fresenius Kabi	Checked	0	632336484
010030781300056		1	Package	00781 - Lek Pharmaceuticals	Checked	0	00781300056
0100307813000215		1	Package	00781 - Teva Pharmaceuticals	Checked	0	00781300021

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## Pill Pick



- Reordering of drugs is generated based on par levels on drug wall
- Drug nest is replenished from the drug wall
- 575 canisters on drug wall



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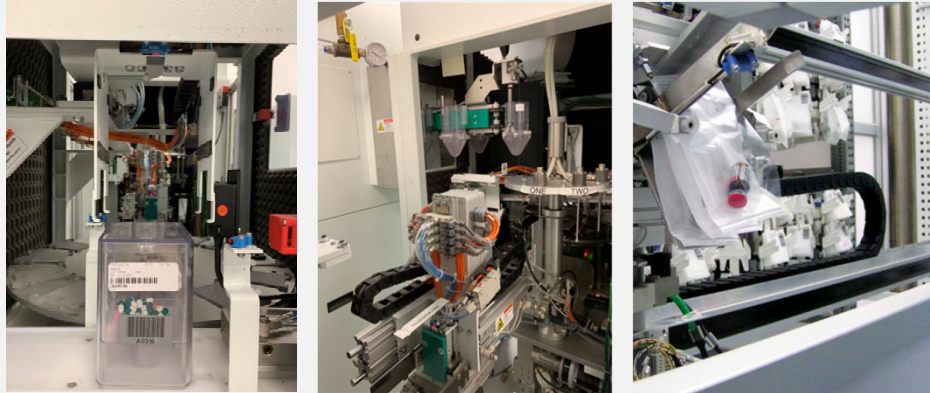
## Drug Wall

- Drug wall consists of canisters, bulk pill bottles, or packs of vials for the autofile
- Par levels for ordering are set in Willow Inventory
- A 15 day supply is kept on the shelf between the canister and bulk bottles based on a rolling 30 day movement history
- Once a canister is filled a pharmacist check is required before the automation will accept the canister for repackage
- Items for drug nest can be tablets, capsules, vials, ampules, etc.



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## Drug Nest Unit Dose Repackaging



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## Drug Nest

- As drugs are packaged from canister into drug nest VIP decrements the quantity from the drug wall inventory and increments the drug nest inventory
- Keep a 4 days min and 6 days max packaged in drug nest based off of a rolling 10 day period of use.
- Drug nest is refilled based off of a below par report generated by the automation



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## Drug Nest

- Displays orders ready to dispense
- Cartfill
- Automated dispensing cabinet refill-batch
- ADC stock outs

The screenshots show the Pyxis Manager interface with the following data:

UNIT	PRIORITY	PAT	JOB STATUS	CABINET
C125H (C125H)	STOCK OUT	0 PT	New	
C12AB (C12AB)	CRITICAL LOW	0 PT	New	
C21D (C21D)	CRITICAL LOW	0 PT	New	
COR4A (UH OR CONVERTED TO JAMES)	CRITICAL LOW	0 PT	New	
C17C (C17C)	PYXIS	0 PT	Ready	

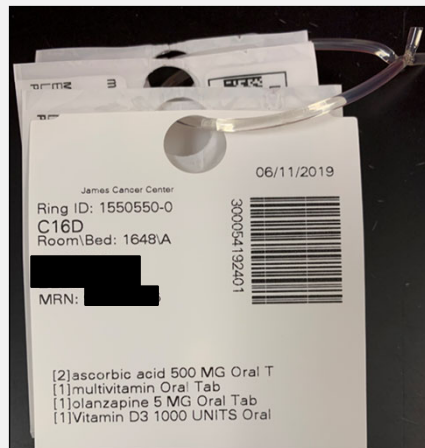
UNIT	PRIORITY	PAT	JOB STATUS
C20A (C20A)	CRITICAL LOW	0 PT	New
C18C (C18C)	PYXIS	0 PT	Unload
C18D (C18D)	PYXIS	0 PT	
C21A (C21A)	PYXIS	0 PT	
C21C (C21C)	PYXIS	0 PT	
C21D (C21D)	PYXIS	0 PT	

UNIT	PRIORITY	PAT	JOB STATUS
C16D (C16D)	CARTFILL	8 PT	Unload
C17A (C17A)	CARTFILL	12 PT	Unload
C17C (C17C)	CARTFILL	9 PT	Unload
C17D (C17D)	CARTFILL	5 PT	Unload
C18C (C18C)	CARTFILL	11 PT	New
C18D (C18D)	CARTFILL	11 PT	New
C19A (C19A)	CARTFILL	10 PT	New
C19C (C19C)	CARTFILL	10 PT	New
C19D (C19D)	CARTFILL	12 PT	New
C20A (C20A)	CARTFILL	9 PT	New

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## Drug Nest



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## Automated Pharmacy Storage System

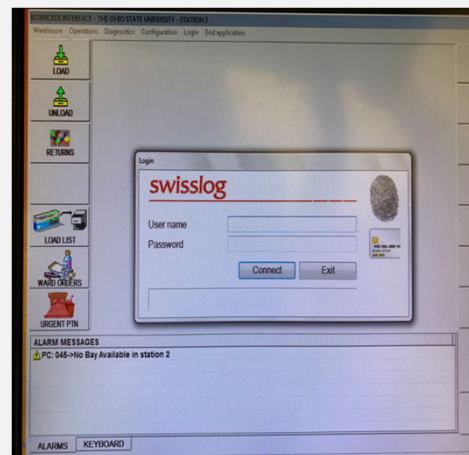
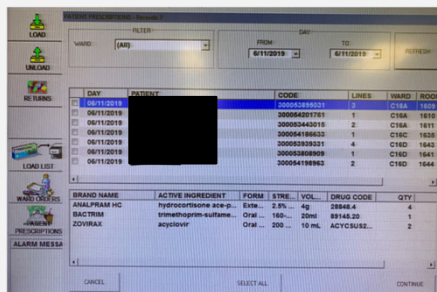
- High density Storage
  - Ambient
  - Refrigerated
  - Dual temperature
- Fully Automated
- Barcode technology
- Multiple work stations
- User safety
- Inventory transparency
- Closed system
- Reporting



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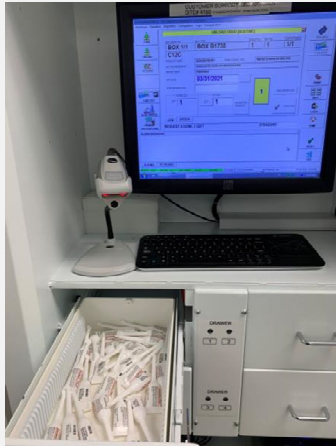
## Automated Pharmacy Storage System

- ADC replenishment
- Patient orders
- Screen alerts of orders to fill



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## Automated Pharmacy Storage System



- User station displays dispense information.
  - Location in box
  - Quantity to pick
  - Box number
  - Delivery Location
- Scan drug
- Label is generated



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## Automated Pharmacy Storage System

- Multiple user workstations
- Boxes for average sized and average usage items
- Special bay drawers allow for high volume or large storage items



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## Automated Pharmacy Storage System

- Fluid inventory location
- Barcode scan technology
- Efficient
- Queue up and go



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## Automatic Tablet Packaging Machine (ATP)



- High speed packaging
- Interface with pharmacy automation and software
- Large storage capacity
- Rapid and accurate packaging
- Front end pharmacist verification



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# Automatic Tablet Packager

- 360-day expiration dating on repackaged medications
- Software interface
- Ease of use
- Large storage capacity
- Minimal operator oversight
- Replenished through Willow

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35[illegible]

- Specific ADC refills
- Packaged tablets have a detailed lead label
- Safety spacer label prints between each NDC per location



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## Automated Dispensing Cabinet

- Automated dispensing cabinet
- Secure medication and dispensing on the nursing units
- Quick access to medications
- Storage of controlled substances and large volume solutions
- Eliminate in pharmacy dispensing for fast moving items
- Comprehensive reporting
- Interface with other pharmacy technologies
- Fast replenishment
- 24 hours of stock



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## Automated Chemotherapy Compounding Robot



- Robotic IV preparation device
- Closed system limits exposure to cytotoxic medications
- Increased accuracy of dose preparation via the robot's gravimetric measurement
- Interfaces with VIP
- Visual verification via camera for pharmacist
- Multiple doses back to back without intervention
- Used for standardized dose compounds

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## Learning Activity

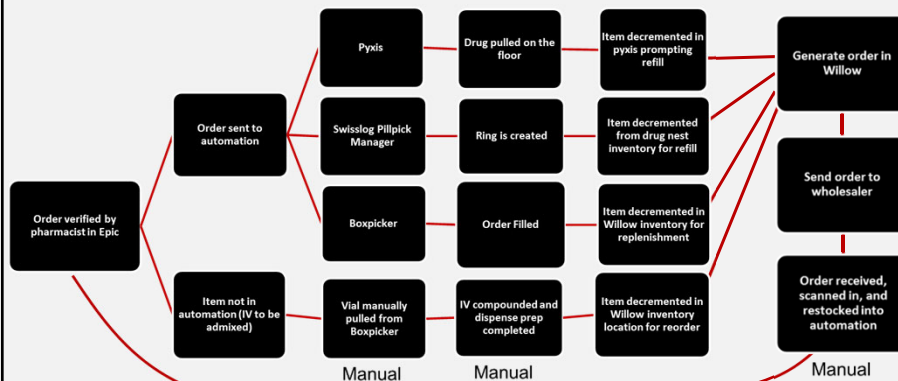
### Automation Exercise:

- Create a flowchart of your pharmacy drug inventory model from medication label dispense through drug replenishment process.
- Please include both automated and manual steps in the process.



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## Pharmacy Inventory Workflow



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